Progress in Community Health Partnerships.2007;1:41-48

Conducting Needs Assessment Using the Comprehensive Participatory Planning and Evaluation Model to Develop Nutrition and Physical Activity Interventions in a Rural Community in the Mississippi Delta

Murugi Ndirangu, PhD, Med[1], Helen Perkins[2], Kathleen Yadrick, PhD, RD[3], Jennifer Rebecca West, MPH[4], Margaret L. Bogle, PhD, RD[5], Amanda Avis-Williams, MPH[3], Ross Santell, PhD[6], Carol Connell, PhD, RD[3]

(1) Center for Global Health and Economic Development, The Earth Institute, Columbia University; (2) Hollandale NIRI Community Committee, Hollandale, Mississippi; (3) The University of Southern Mississippi, Department of Nutrition and Food Systems; (4) Nova Southeastern University College of Osteopathic Medicine, Fort Lauderdale, Florida; (5) USDA/Agricultural Research Service - Delta Nutrition Intervention Research Initiative; (6) Alcorn State University, Department of Human Sciences

Project Supported by ARS/USDA Project #6251-52000-0020-000.

Submitted 30 January 2006; revised 26 April 2006; accepted 15 June 2006.

Abstract

Background: Members of a Lower Mississippi Delta community and university partners used the Comprehensive Participatory Planning and Evaluation (CPPE) model to assess nutrition and health problems and develop a menu of interventions.

Objectives: We sought to identify and prioritize nutrition and physical activity problems in the community and to identify interventions to address the problems.

Methods: Community members and university partners used the CPPE process to identify and prioritize nutrition and physical activity problems. The participants developed causal models to break down the identified problems to their root causes. They then developed a menu of interventions and criteria to rank the interventions.

Results: The identified problems were intake of unhealthy foods, lack of nutrition education, and lack of adequate physical activity. The menu of interventions consisted of seven objectives to address poor nutrition and physical activity as well as a total of 19 interventions to meet these objectives.

Conclusion: Directly involving community members in identifying health problems and solutions results in the development of interventions that are likely to have greater acceptability with the community.

Keywords

needs assessment, community participation, nutrition intervention planning, partnerships

Development of health programs at the community level has received renewed focus as a result of a move away from the traditional, individual-focused medical model.[1] As a consequence, there has been an increase in the use of socioecologic theories such as the community-based participatory research methodology. The role of community participation in health care planning was first formally recognized in the early 1970s following a realization that basic health needs could only be met through increased involvement of local people. Community participation was a major component of the World Health Organization's primary health care initiative signed in Alma Ata in 1978.[2] The Ottawa charter for health promotion[3] of 1986 stressed the role of community action in setting priorities, making decisions, and planning and implementing strategies for better health. Community participatory research assumes that solutions to health problems are to be found within the community and are known to community members.

Planning models used to engage community members in designing interventions in health have been developed. Examples of such models include the Comprehensive Parti-

cipatory Planning and Evaluation (CPPE),[4] the Planned Approach to Community Health,[5] the Community Health Advisor Network,[6] and the PRECEDE–PROCEED.[7]

Residents of the Lower Mississippi Delta (LMD) region have high rates of hypertension, cardiovascular disease, obesity, diabetes, and cancer.[8] Residents of this region have also been reported to have high fat intake and low consumption of fruits and vegetables.[9,10] In 1995, the U.S. congress recognized a need for large-scale, multifaceted nutrition interventions to address nutrition issues in this region. Congress, through the U.S. Department of Agriculture's (USDA) Agricultural Research Service, responded by funding the Lower Mississippi Delta Nutrition Intervention Research Initiative (Delta NIRI). The Delta NIRI project is a multiyear initiative managed by a consortium consisting of the USDA and seven institutions of higher education and research in Louisiana, Arkansas, and Mississippi. The universities represented on the consortium are Pennington Biomedical Research Center, Southern University and A&M College, Arkansas Children's Hospital Research Institute, University of Arkansas at Pine Bluff, University of Arkansas for Medical Sciences School of Public Health, Alcorn State University, and the University of Southern Mississippi. The primary goals of the Delta NIRI project are to evaluate nutritional health in the LMD and to design, implement, and scientifically evaluate nutrition interventions using community participatory methodologies.

HISTORICAL CHRONOLOGY OF COMMUNITY ENTRY

In 1996, the Delta NIRI consortium conducted bus tours of the LMD during which fact-finding meetings with community groups were held. In 1997, key informant surveys were conducted with 500 community leaders in 36 LMD counties and parishes.[10] The Foods of Our Delta Study was carried out in 2000. This was a cross-sectional telephone survey of approximately 1,660 households in 18 counties and parishes.[11] In 2001, multiple research activities were carried out. A food store survey was conducted in 228 stores in counties and parishes across the LMD. A total of 36 focus group interviews on knowledge, attitudes and beliefs associated with consumption of healthy foods were also done in nine counties and parishes. Another bus tour was conducted, this time to visit potential intervention communities. The tour consisted of a joint 2-day tour of Arkansas and Mississippi and a 2-day tour of Louisiana. Upon conclusion of the assessment and data collection phases, the Delta NIRI consortium chose to begin community intervention in one county or parish in each state.

The consortium consulted local leadership, community members, and university partners to identify the three specific communities. Communities were selected on the basis of the community members' willingness to work with the consortium, as expressed by community representatives, and an established track record for working with outside agencies. The consortium met with formal and informal local leaders in each of the identified communities. During these meetings, the Delta NIRI mission was communicated and support and participation solicited from the community members. In each of the communities selected community–academia committees were formed with representatives from the community, universities, and the USDA to plan, implement, and evaluate nutrition interventions in the communities. Elected officials lead the committees with the chairperson always being a member of the community and the secretary a representative from the universities. The committees conduct their business through the general committee or by formation of subcommittees to manage specific tasks. Community leaders are continuously involved in raising awareness about the Delta NIRI project in the wider community as well as recruiting community members to participate in the community–academia committees. This article provides a description of the participatory process followed by community and university representatives in the Mississippi Delta NIRI community–academia committee to assess needs and plan nutrition and physical activity interventions using the CPPE model.

METHODS

As a part of community entry, members of this rural Mississippi delta community and university representatives conducted a needs assessment to identify health and nutrition problems in their community and develop a menu of interventions. The participating community was mostly African-American. Socioeconomic indicators categorized this community as low income and high risk, with higher rates of unemployment, infant mortality, low-birth weight

infants, births to teen mothers, and families living below the poverty level compared with national averages.[12] Members of this community formed a community–academia partnership with Alcorn State University, the University of Southern Mississippi, and the USDA to address some of these nutrition and health concerns.

The CPPE model emphasizes the direct and active participation of community members in the assessment of nutritional needs and planning and evaluation of interventions. It stresses the identification of root causes in addressing nutrition and health problems. The model enables community members to work through five phases to plan and evaluate interventions. The phases consist of problem assessment, identification and selection of interventions, design of interventions, setting up a monitoring and evaluation system, and development of a proposal that summarizes all the phases.

Thirty community members and university representatives were invited by letter and word of mouth to two all-day workshops. The community–academia committee that organized the workshops prespecified the purpose of the workshops as the development of a menu of interventions to address nutrition and other health problems in the community. The community participants were local residents and individuals affiliated with various sectors in the community such as the local school district and city government. This paper describes in details how participants from the community and the universities worked together through the first two phases of the CPPE model, namely, problem assessment and the identification and selection of interventions. Activities that have since occurred or are currently underway related to the three other phases, that is, the designing of interventions, the setting up a monitoring and evaluation system, and the development of a proposal that summarizes all the phases, are reported in brief.

Phase 1: Problem Assessment

During the first workshop, 21 community members and nine university representatives worked in four groups of six to eight people. The role of the university members was to listen to the community members and keep a record of the discussion, including noting valuable comments. Community members in each group discussed and then listed the health problems experienced in their community. All members agreed on the problems identified before the groups presented their lists of problems to the workshop participants in a joint session. Problems identified by each group were listed on charts by the workshop facilitator. Themes common to all the groups were highlighted and then participants identified the top three problems by voting on each one. Each person had only one vote. The problems were prioritized according to the number of votes they received from the highest to the lowest. Through discussion, all participants agreed that the community would focus on the top three problems prioritized. The top three problems identified by community members as of importance to their community in order of priority were the (1) intake of unhealthy foods, (2) lack of nutrition knowledge, and (3) lack of adequate physical activity.

Community members then developed causal models for the three problems identified with the help of the university representatives and workshop facilitator. *Causal models* are graphic depictions that attempt to break down the identified problem to its root causes. Once identified, the root causes could then be targeted using appropriate interventions. Each group developed its causal models independently then presented them to the entire group. The community members developed a total of six causal models. Three causal models were developed to break down the intake of unhealthy food. One causal model was developed to analyze the lack of nutrition knowledge. Two causal models were developed to analyze the lack of adequate physical activity. Illustrations of the causal models are presented in Figures 1, 2, and 3.

Some common themes on root causes arose from different groups. For example, with the intake of unhealthy foods, the restrictions governing the use of food stamps as well as the misuse of food stamps were identified as root causes. These sentiments were captured in the following comments noted during discussion in two groups:

> [People] buy chips and soda because they can't buy other cooked foods [using food stamps].

> If food stamps could be used to buy cooked meals then maybe people would buy that instead of potato chips.

Participation in the development of causal models appeared to be equally shared by the university and com-

munity participants. When presenting the causal models during the joint session, two groups had community members as spokespersons and two had academics.

At the conclusion of the first workshop, community members expressed a need to share the results of the workshop with the wider community to make them aware of the results from the first workshop and get feedback and confirmation on the three issues and root causes. Community members suggested that field surveys be conducted to verify eating habits, physical activity levels, and nutrition knowledge. A notable comment that captured how community members felt about their involvement in assessing their nutrition and physical activity needs was:

> I would say to keep momentum, to prepare the [causal model] document so the group here doesn't lose interest and [the community] can take a lead on deciding where we need to go.

As a follow-up to the community's members' request that field surveys be conducted to verify eating habits, physical activity levels, and nutrition knowledge, baseline surveys that had been conducted previously in 36 counties in the LMD during community entry were shared with community members during community-wide meetings. The community members on the community–academia committee agreed that the findings from these surveys were applicable to their community. Sharing this information, they felt, would help to raise awareness on nutrition and physical activity needs in the community and further explain the mission of the Delta NIRI project. During these meetings, the results of the first CPPE workshop were also shared with community members

Phase 2: Identification and Selection of Interventions

About 1 month after the first workshop, community and university representatives attended a second workshop during which they further examined the root causes, selected ones community members wanted targeted, and identified and ranked interventions to address these causes. Eighteen people attended this workshop, nine members each from the community and the universities. Workshop attendees worked together in three groups, six members per group. The participants once again considered the root causes outlined on the causal models and picked out those they wished to target. Community members focused on root causes they felt were within their ability to influence and also those that fit within the Delta NIRI project mission. They concentrated on causes that related directly to nutrition and physical activity. For instance, participants did not further consider "decreasing population" as a root cause for lack of physical activity. In a joint session, participants brainstormed strategies to address the selected root causes. As the discussion proceeded, participants chose to capture the ideas being suggested in seven broad objectives that would address the root causes.

Participants then discussed how the outlined objectives could be to achieved. They proposed interventions to achieve each of the objectives. A total of 19 intervention ideas were proposed to achieve all the objectives. The

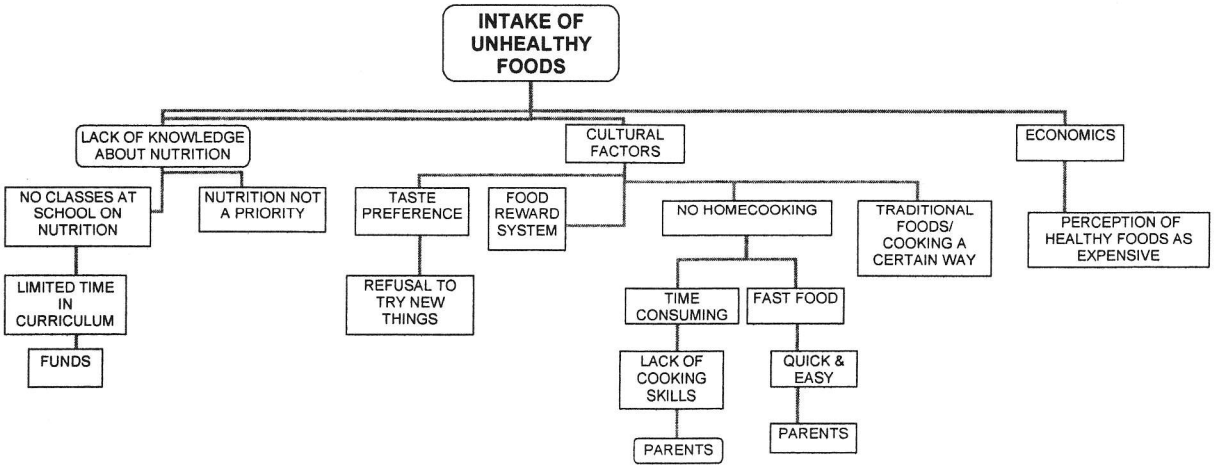

Figure 1. Causal model of root causes related to intake of unhealthy foods

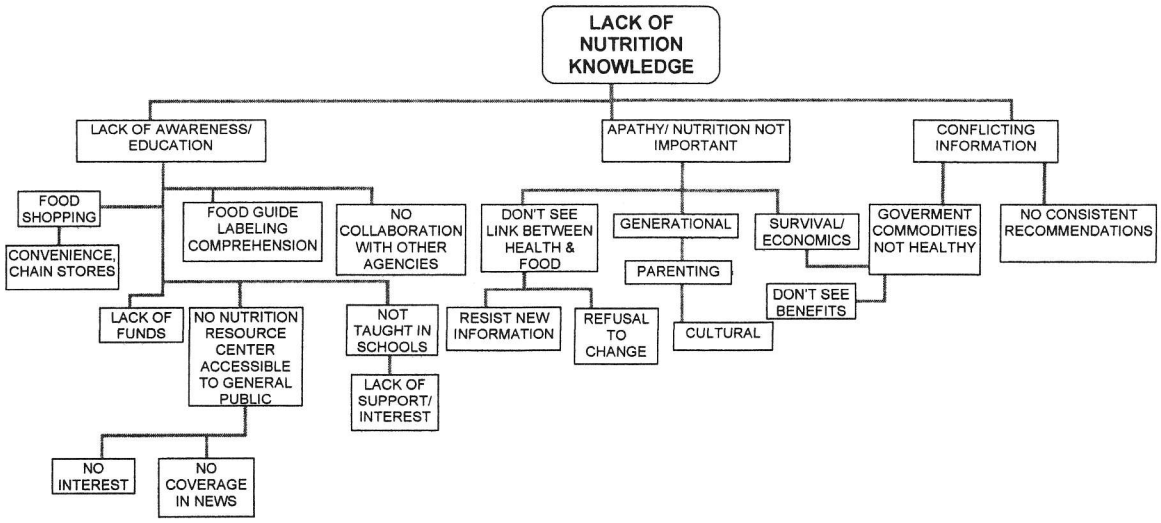

Figure 2. Causal model of root causes related to lack of nutrition knowledge

participants ranked the interventions ideas under the relevant objectives by an established criteria. The criteria consisted of five features. These were that the interventions should be acceptable to the community, efficient in terms of cost and time, likely to have community impact, sustainable, and feasible. Each intervention idea was scored on a scale of 1 to 5, with 5 being a high ability to meet the criterion and 1 being a poor ability to meet the criterion. The total score for each intervention from the five criteria was totaled and used to prioritize intervention ideas under the relevant objective. Table 1 presents an example of how the intervention ranking for the first objective was worked out. Table 2 presents the complete ranked interventions menu.

Progress in the Other Comprehensive Participatory Planning and Evaluation (CPPE) Model Phases

The Mississippi Delta NIRI community–academia committee has carried out or is in the process of carrying out the other three phases of the CPPE model. These phases are designing interventions, setting up a monitoring and evaluation system, and developing a proposal that summarizes all the phases.

Phase 3: Designing interventions. The Delta NIRI community–academia committee has developed and imple-

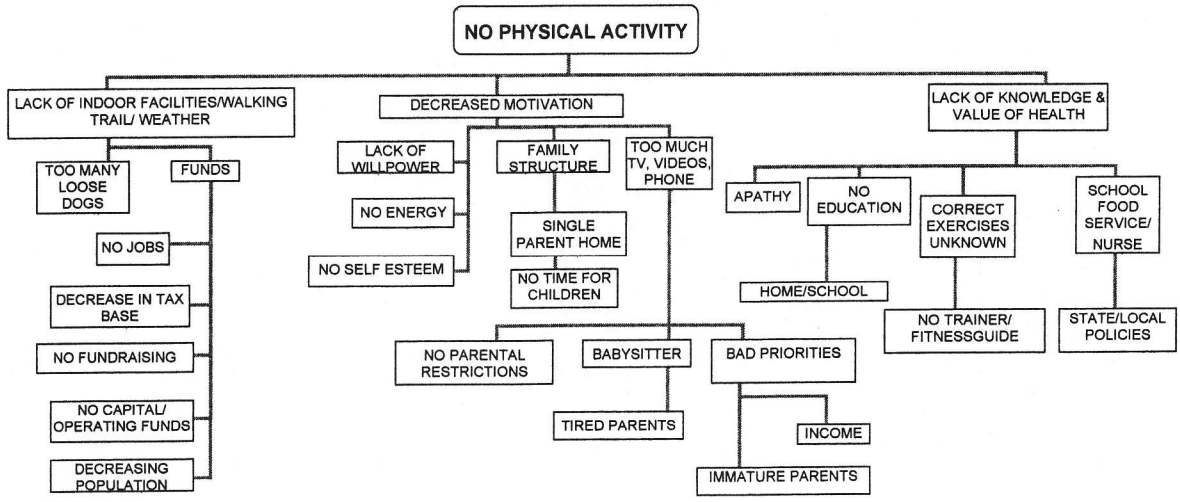

Figure 3. Causal model of root causes related to lack of adequate physical activity

mented nutrition and physical activity interventions in the Mississippi community. The nutrition interventions currently under implementation include raising awareness about nutrition and physical activity by taking part in community events during which representatives from the Delta NIRI community–academia committee make presentations. The committee members have participated in events such as health fairs and Christmas parades, during which they offer services such as free blood pressure checks and distribute pamphlets with health messages. Nutrition education sessions have also been held for community members, including work-study sessions held for youths during summer vacations. A walking trail has been constructed in the community and a physical activity intervention that encourages walking is underway.

Phase 4: Setting up a monitoring and evaluation system. As the community–academia committee continues to develop and implement interventions, strong process and outcome evaluation components have been developed and are ongoing as the interventions unfold.

Phase 5 Development of a proposal that summarizes all the phases. All the phases of the CPPE process have been outlined in a manual of procedures prepared by the community–academia committee. The manual is available to all partners and guides planning, implementation, and evaluation of interventions in the community.

DISCUSSION

Participatory planning models such as the CPPE model allow community members to actively participate in designing nutrition and other health interventions in their community.[13] These models recognize that community members know their communities best. They allow researchers and intervention planners to take into account communities' perspectives, strengths, and needs.[14] The CPPE process enabled the community members engaged in this exercise to share knowledge of their community. At the conclusion of the two workshops, community members had clearly identified problems related to nutrition and physical activity issues in their community. They recognized the root causes and factors related to these problems. Community members also enumerated possible solutions to these problems.

The level of particip ation in research may vary depending on the extent and quality of influence exerted over the process by the participants.[15] Community and university partners seemed to participate equally in this exercise. All participants had input, with the university partners taking on the role of listeners and recorders of the community partners' thoughts. Community members were encouraged to have no reservations in expressing their opinions. At the conclusion of the workshops, participants evaluate the workshops in writing by commenting on the level of community participation and what they liked about the workshops. Community members expressed satisfaction with their level of participation and enjoyment of the exercise with comments such as:

I feel we were well represented.

Table 1. Example Showing the Process of Ranking of Interventions Under Objective 1: To Increase Nutrition Knowledge and Skills in Buying and Preparing Healthy Foods for Parents

	Criterion (scored 1–5)							
Intervention	Acceptability to community	Cost efficiency	Time efficiency	Community impact	Sustainability	Feasibility	Score	Rank
Food label reading education	4	5	5	4	3	4	25	4
Hold cooking contest and judge it by certain healthy standards	5	4	4	4	5	4	26	3
Organize cooking classes, offer discount grocery coupons for attendance	5	4	5	5	5	5	29	1
Link cooking classes to job training—partner with hotels, casinos, hospitals	4	5	5	5	4	4	27	2

I'm enjoying this. I thought it was going to be a boring Saturday.

Paulo Freire[16] distinguishes between two levels of participation—cultural invasion and cultural synthesis. *Cultural invasion* is typified by the traditional empirical approach, whereas *cultural synthesis* allows for the community and outsiders to learn from and enrich each other. The CPPE process allowed cultural synthesis; community and university partners learned from each other. This is a move away from the top-down decision-making process in traditional research methodologies where the community is only involved during the implementation stage of a research procedure. By actively participating in this exercise, community members helped to define the research agenda and identified interventions that they felt would work in their setting.

Three limitations were identified when using the CPPE planning process. First, the CPPE process required community members to sacrifice a substantial amount of time to attend the day-long workshops. Some community members who were willing to contribute to the planning process were unable to attend the workshops owing to time commit-

Table 2. Ranked Intervention Menu

Objectives	Intervention Ideas
1. a) To increase nutrition knowledge and skills in buying and preparing healthy foods for parents	1. Organize cooking classes and offer discount grocery coupons for attendance. Recruit parents to participate in nutritional instruction—food preparation, purchasing, raising own vegetables.
1. b) Teach how to prepare subsidized foods such as that provided by WIC in ways that are healthy and acceptable and to educate parents on how to use food stamps wisely	2. Link cooking classes to job training—partner with restaurants, hotels, casinos, hospitals, school food service.
	3. Hold a cooking contest and judge it by certain healthy standards.
	4. Food label reading education.
2. To decrease the amount of unhealthy food and increase the amount of healthy food consumed	1. Implement grocery store specials on healthy foods at the end of the month.
	2. Address "eating to get full" versus "eating healthy" in nutrition education classes.
3. To identify way to disseminate nutrition information that is culturally and age appropriate.	1. Create brochures, billboards, spot on Saturday morning television during cartoons, on Sundays during church services, use local newsletters, use city information board
	2. Establish a nutrition resource center to provide counseling, and teaching about nutrition and physical activity and cooking demonstrations
4. To increase time allocated to teaching about nutrition and physical activity in the local schools.	1. Mandatory teaching of nutrition and fitness curriculum for prescribed minutes per day and require home economics in schools
	2. Physical activity training of "leaders" by a local person to train adolescents and adults
	3. Competition by PTA to promote physical activity
	4. Give kids a "reward" for bringing in grocery receipts with healthy foods, kids do classroom activity to log foods and compete with other classrooms
5. To develop a community/school garden that community members and children would tend	1.Identify sites that are user friendly for food production
6. To assess available resources and promote outdoor exercises that can be done in the community	1. Have a weight loss contest. Winner receives cash reward.
	2. Assess unused facilities in the community for indoor gym use.
	3. Meet with city inspector, park committee to discuss sidewalks, community playground and other walking trails.
	4. School "parent of the month" on an exercise TV advertisement showing exercise is easy.
	5. Install lights on entry of a local street for walking.
7. To control loose dogs	1. Work with mayor's office to enact fines for loose dogs that discourage walkers.

ments. Second, the CPPE process worked best when the participants had some minimum level of literacy. Progressing through the planning phases required reading and writing skills. This might be a challenge among low-literacy groups. Third, the causal model process generated some root causes that were of priority to the community members but were not within the mandate of the USDA partner to address. The lack of attention to these root causes could have discouraged some community members. However, this also provided an opportunity for community members to be directed to other resources that could address these issues.

The CPPE model process may be used by most community groups to plan, implement, and evaluate interventions. It affords community members and their partners an opportunity to thoroughly analyze the health issues facing the community and figure out solutions. To effectively do this, the community and academic partners must be willing to dedicate time to the process and carry it to its conclusion. The model is flexible and can be applied to any health problem.

CONCLUSION

Directly involving community members in identifying their problems and solutions to these problems allows program planners to develop interventions that may have greater acceptability with the community and likely more effectiveness and sustainability in the long term. Working in partnership with the universities benefited this community by bringing research resources into the community and potentially enhancing the capacity of its members. In turn, the university partners gained an insider's perspective of the community, thereby increasing the likelihood of developing targeted programs that are more likely to be sustained.

REFERENCES

1. Zakus JDL, Lysack CL. (1998). Revisiting community participation. *Health Policy Plan, 13*(1), 1-12.
2. World Health Organization (WHO). (1978, September 6–12). *Declaration of Alma-Ata.* International Conference on Primary Health Care, Alma-Ata, USSR. Retrieved July 25 2005, from http://www.who.int/hpr/NPH/docs/declaration_almaata.pdf.
3. World Health Organization (WHO). (1986, November 17–21). *Ottawa Charter for Health Promotion.* International Conference on Heath Promotion: The Move Towards a New Public Health. Ottawa, Ontario: Canada.
4. LefevreP, Kolsteren P, De Wael M, Byekwaso F, Beghin I. (2000). *Comprehensive participatory planning evaluation.* Retrieved April 4, 2004, from http://www.ifad.org/pub/bsf/cppe/cppe.pdf.
5. Kreuter MW. (1992) Patch: Its origin, basic concepts, and links to contemporary public health policy. *J Health Educ, 23*(3), 135–139.
6. Hinton A, Downey J, Lisovicz N, Mayfield-Johnson S, White-Johnson F. (2005). The community health advisor program and the Deep South network for cancer control: Health promotion programs for volunteer community health advisors. *Fam Community Health, 28*(1), 20–27.
7. Green LW, Kreuter MW. (1999). *Health promotion planning: An educational and ecological approach.* Mountain View, CA: Mayfield Publishing Company.
8. Casey PH, Szeto K, Lensing S, Bogle M, Weber J. (2001). Children in food-insufficient, low-income families: Prevalence, health, and nutrition status. *Arch Pediatr Adolesc Med, 155,* 508–514.
9. Champagne CM, Bogle M, McGee BB, Yadrick K, Allen HR, Kramer TR., et al. (2004). Lower Mississippi Delta Nutrition Intervention Research Initiative. Dietary intake in the lower Mississippi delta region: Results from the Foods of our Delta Study. *J Am Diet Assoc, 104,* 199–207.
10. Yadrick K, Horton J, Stuff J, McGee B, Bogle M, Davis L, et al. (2001). Perceptions of community nutrition and health needs in the lower Mississippi Delta: A key informant approach. *J Nutr Educ, 33,* 266–277.
11. Champagne CM, Bogle M, McGee BB, Yadrick K, Allen HR, Kramer TR, et al., (2004). Lower Mississippi Delta Nutrition Intervention Research Initiative. Dietary intake in the lower Mississippi delta region: Results from the Foods of our Delta Study. *J Am Diet Assoc, 104,* 199–207.
12. U.S. Census Bureau. (2000). *Fact sheets: Highlights from the census 2000 demographic profiles.* Retrieved June 17, 2004, from http://factfinder.census.gov.
13. Lyons M, Smuts C, Stephens A. (2001). Participation, empowerment and sustainability: (How) do the links work? *Urban Stud, 38,* 1233–1251.
14. Tchibindat F, Mouyokani I, Yila-Boumpoto M. (2002). Choice of nutritional interventions in Congo: An approach for primary health care centres and for the community. *Sante, 12,* 100–106.
15. Sharpe PA, Greaney ML, Lee PR, Royce SW. (2000). Assets-oriented community assessment. *Public Health Rep, 115,* 205–211.
16. Freire P. (2000). *Pedagogy of the oppressed* (30th anniv. ed.). New York: Continuum.